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**MODERN SEWAGE and  
WATER TREATMENT  
PLANTS**

628.3

SEP 20 1930

**2ND SERIES**

**THE DORR COMPANY**

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# **MODERN SEWAGE and WATER TREATMENT PLANTS . . . 2<sup>ND</sup> SERIES**

Illustrated by photographs of representative installations, together with a brief description of each plant and of the applications of Dorr Equipment to the various methods of treatment used



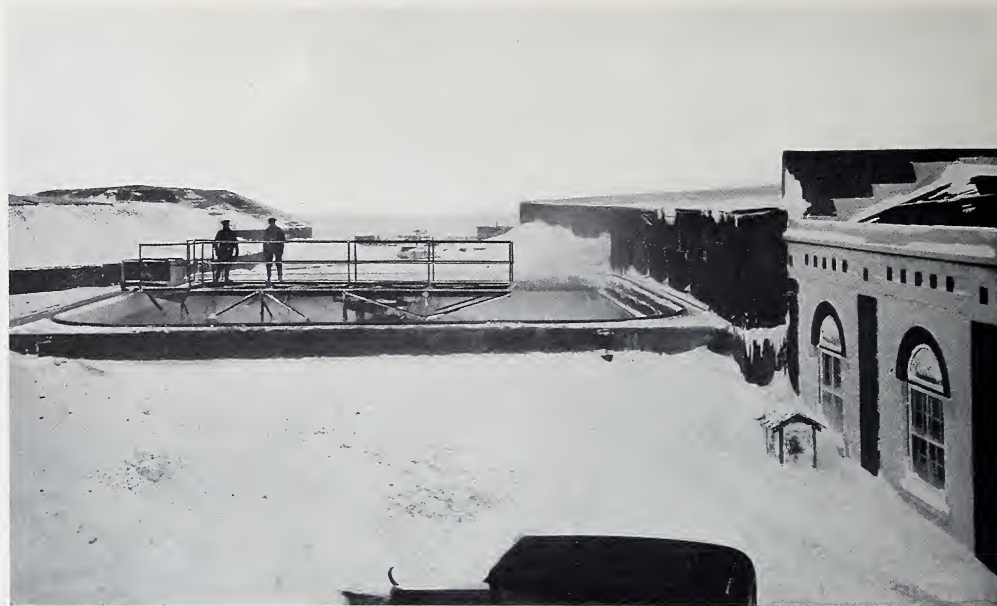
**THE DORR COMPANY**  
*Engineers*

**247 PARK AVENUE, NEW YORK CITY**

*For full list of offices, associated Companies,  
and representatives, see page 39*



**REGINA,  
SASK.**



Twice have Dorr Traction Clarifiers been added to the sewage treatment plant at Regina, Sask. In 1929, when the method of treatment was changed to activated sludge and the plant was remodelled, the unit shown above was installed. Just recently a second Traction Clarifier similar to the first was put in to further increase sedimentation capacity. These plant improvements and enlargements were carried out under the direction of D. A. R. McCannel, City Commissioner and R. W. Allen, Assistant City Engineer.

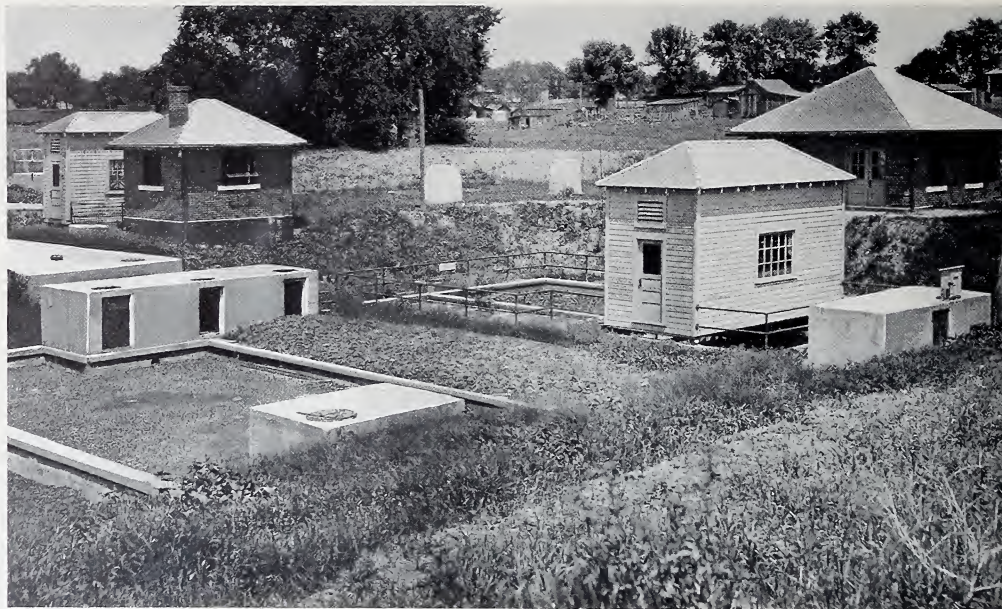


**SAGINAW,  
MICH.**



**T**his attractive-looking water treatment plant serves the city of Saginaw, Mich. Screening, coagulation, sedimentation, filtration and carbonation are the steps used in the treatment process. Two Dorr Clarifiers are used to remove continuously the precipitated sludge from the water, following the coagulation step. Hoad, Decker, Shoecraft and Drury, Ann Arbor, and Maury and Gordon, Chicago, were the Consulting Engineers for this plant. Victor A. Matteson, Chicago, Architect.

**HORTON,  
KAN.**



This activated sludge sewage treatment plant serves the city of Horton, Kansas. Two Dorr Clarifiers are installed. One unit is used for pre-sedimentation ahead of aeration and the other for sedimentation of the aerated sewage. † Black & Veatch, Kansas City, Consulting Engineers.

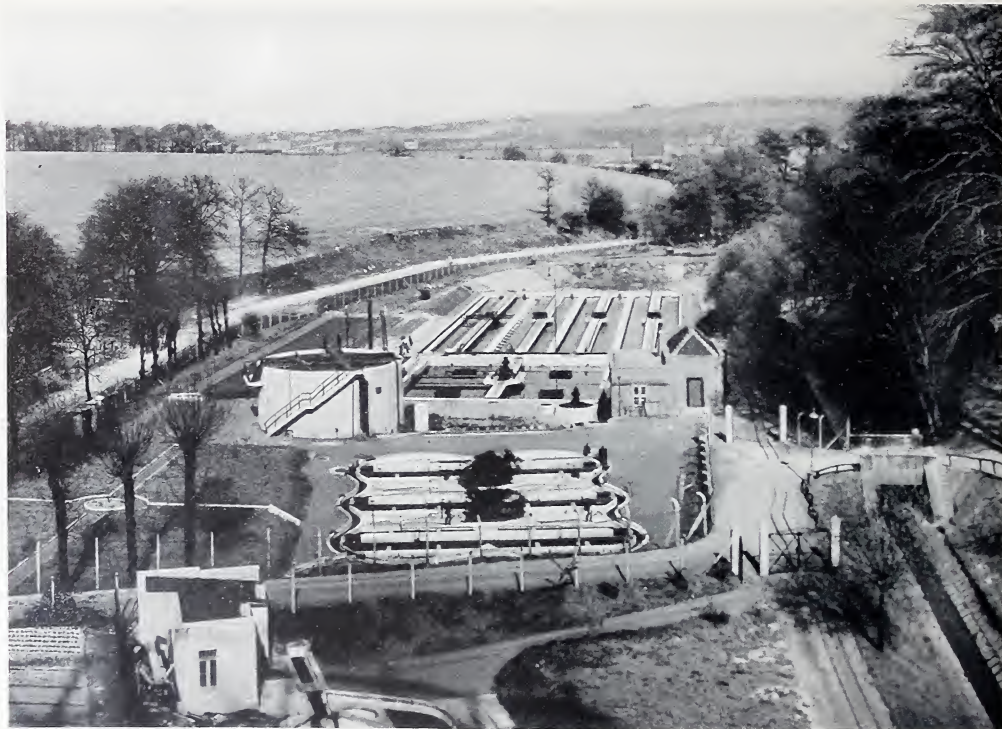


**PETOSKEY,  
MICH.**



Separate sludge digestion is the method of sewage treatment used at Petoskey, Mich. At the right is seen the Dorr Clarifier which is used for sedimentation of the raw sewage and at the left is the gas collection type Dorr Digester. The effluent from the Clarifier is chlorinated and discharged into Lake Michigan. ¶ Pearse, Greeley and Hansen, Chicago, were the Consulting Engineers for this plant, which was built under the supervision of Mr. P. T. Mitchell, City Manager.

**ESSEN-  
RELLINGHAUSEN,  
GERMANY**



This photo shows the Essen-Rellinghausen sewage treatment plant near Essen, Germany. This plant is under the supervision of the Ruhrverband, internationally known "Sanitary District" of the valley of the Ruhr. Last year a Dorr Traction Clarifier, equipped with skimming device, was installed in this plant to increase sedimentation capacity. A Dorr gas-collection type Digester was also installed for digestion of the sludge from the Clarifier. ¶ The Ruhrverband have also installed a Dorr Traction Clarifier and Digester in the new Witten plant.



**ST. LOUIS,  
MO.**



**T**hese four Dorr Clarifiers are installed in the Howard Bend water-treatment plant at St. Louis, Mo. This plant has a present capacity of 55 m.g.d. and treats Missouri River water, which at some seasons runs as high as 15,000 p.p.m. turbidity. The Clarifiers are used for both primary and secondary sedimentation and are flexibly arranged so that more or less units can be thrown into either service, depending on the character of the water being treated. Pre-sedimentation of the turbid water in Dorr Clarifiers very materially reduces the quantity of chemicals required for coagulation. † L. A. Day, Water Commissioner. E. E. Easterday, Designing Engineer. John D. Fleming, Chief Chemical Engineer.

**TUCSON,  
ARIZ.**



This photo shows the two Dorr Clarifiers used for sedimentation of raw sewage in the separate sludge digestion plant at Tucson, Arizona. The effluent from the Clarifiers flows into broad irrigation ditches and is used on city farmlands for irrigating alfalfa crops. ' Black & Veatch, Kansas City, Consulting Engineers.

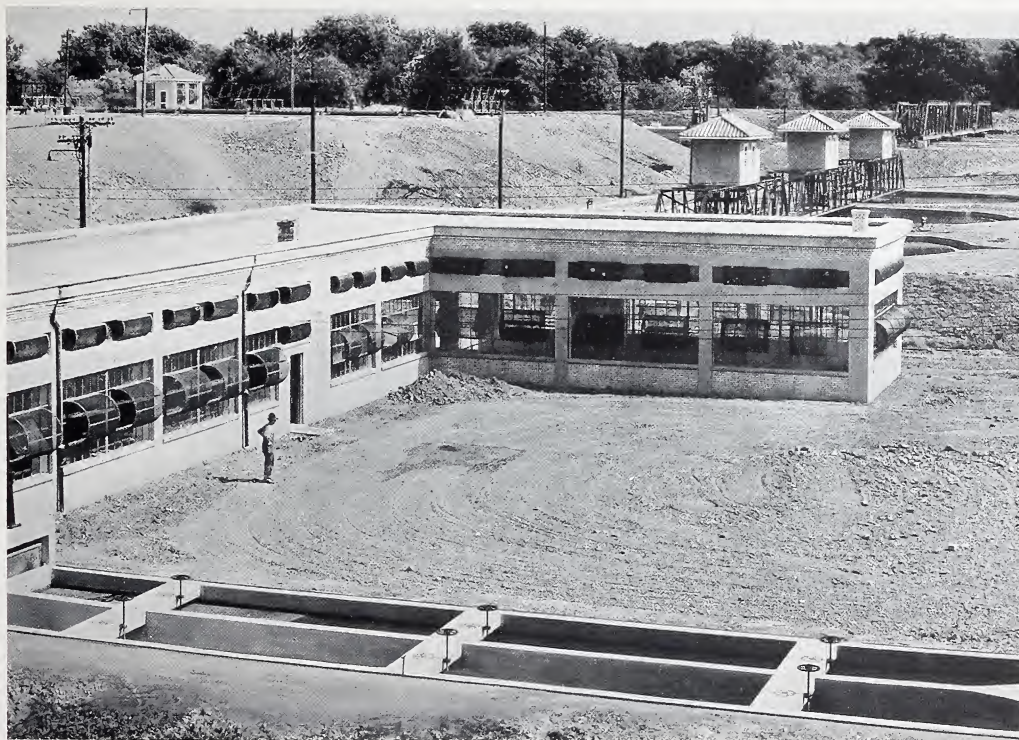




**PIQUA,  
OHIO**

**T**his photo shows the water softening plant at Piqua, Ohio. Aeration, chemical dosage, sedimentation, carbonation, filtration, and chlorination are the treatment steps used. A Dorr Clarifier is installed for sedimentation of the water leaving the mixing tanks. The Clarifier continuously removes the precipitated sludge from the water, averaging about 97 per cent removal. Only about 0.75 per cent of the total water taken into the plant is wasted with the sludge removed by the Clarifier. ¶ The plant was designed by Wm. G. Clark, Consulting Engineer, Toledo, in association with Charles P. Hoover, Columbus.

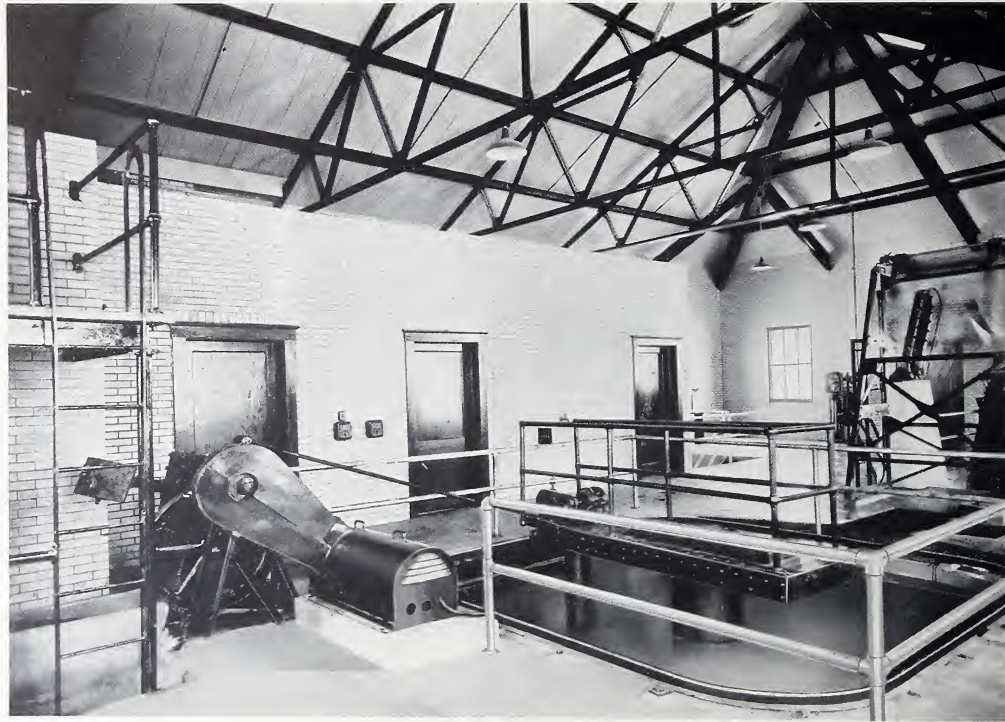




**FORT WORTH,  
TEX.**

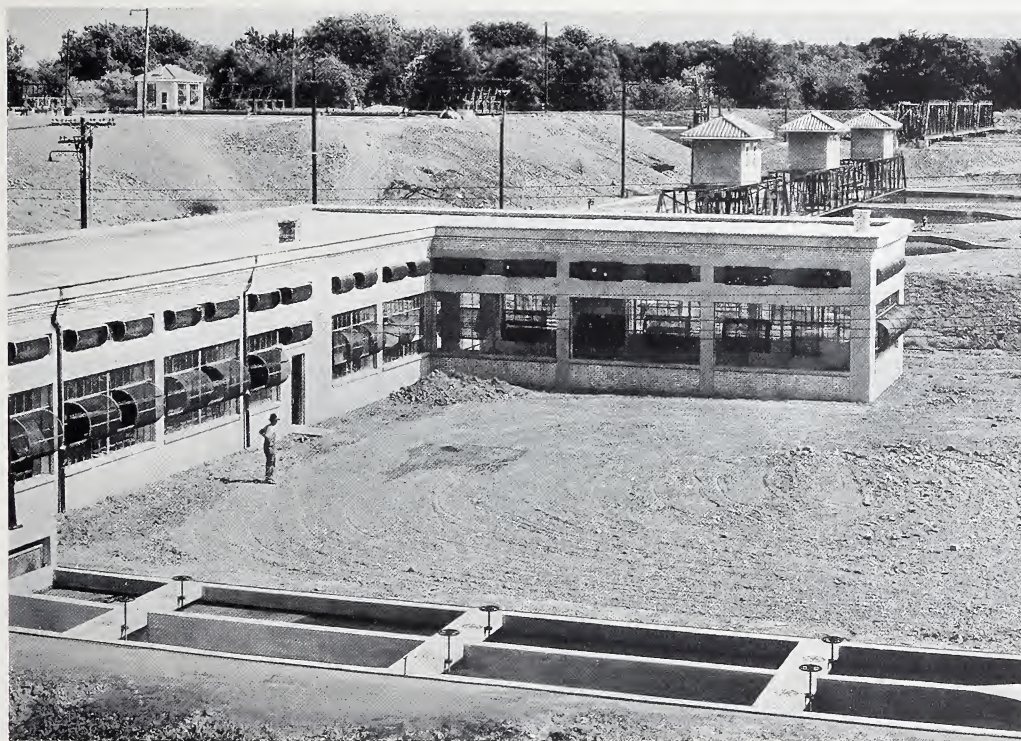
In 1923, when the first sewage treatment plant was constructed at Fort Worth, Tex., two Dorr Clarifiers were installed for sedimentation of trickling filter effluent. In 1928, extensive changes and enlargements to the plant were undertaken. A Dorrco Bar Screen was installed for the coarse screening step. Four Dorr Clarifiers were put in for sedimentation of raw sewage and three Dorr Digesters for sludge digestion. The plant now operates as a combination activated sludge-trickling filter-separate sludge digestion plant. † The late Mr. E. E. Sands, Houston, was consulting engineer on the original project and Hawley & Freese, Fort Worth, were consultants for the more recent plant enlargements.

**MIDDLETOWN,  
N. Y.**



The Dorr Detritor and Dorrco Bar Screen in the sewage treatment plant at Middletown, N. Y. Separate sludge digestion is the method of treatment used in the plant, which was designed by Fuller & McClintock, Consulting Engineers, New York City.



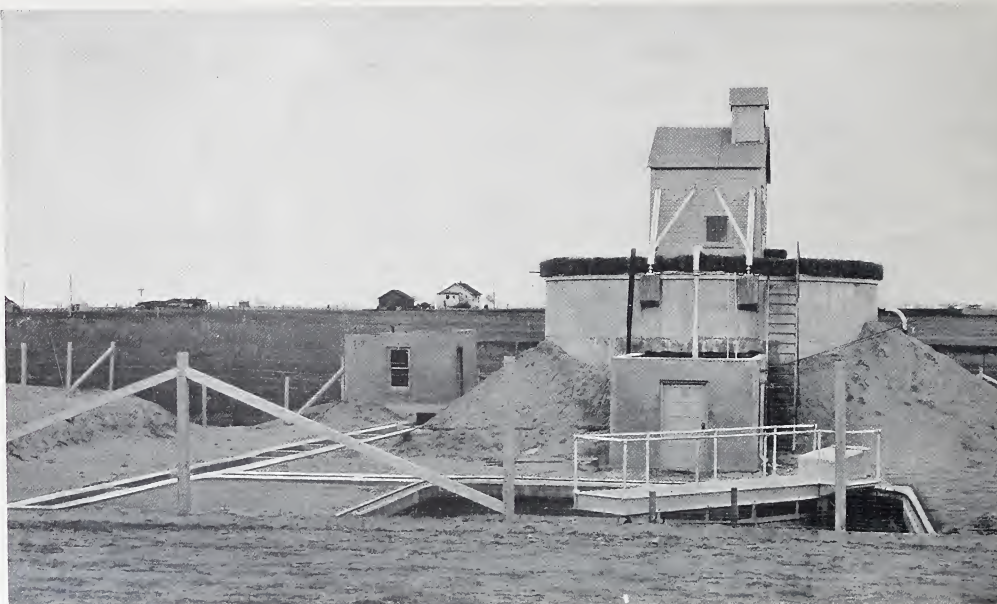


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**AURORA,  
COLO.**



This small separate sludge digestion plant serves the town of Aurora, Colorado. In the foreground are the Dorr Traction Clarifier and pump house, with the covered type Dorr Digester in the background. J. W. McCullough, Denver, Colo., Consulting Engineer.



**CEDAR RAPIDS,  
IOWA**

**I**n the new water-softening plant at Cedar Rapids, Ia., which will go into operation shortly, a Dorr Traction Clarifier is installed for sedimentation of the chemically treated water. There are over 40 water treatment plants in various parts of the world in which Dorr Clarifiers are used. ¶ The Consulting Engineers for the Cedar Rapids plant were Alvord, Burdick & Howson, Chicago.

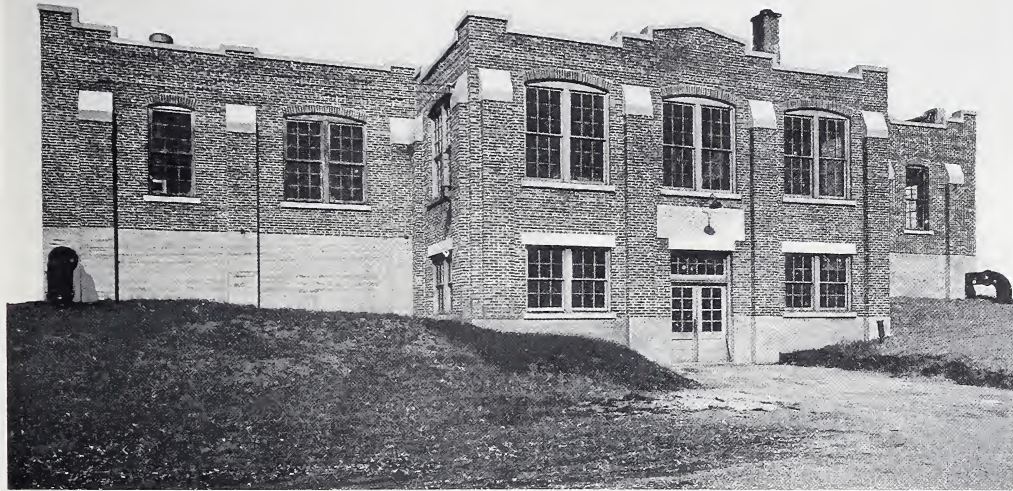
**LAKE CITY,  
FLA.**



This moderate-sized but complete sewage treatment plant was designed for the City of Lake City, Fla., by Geo. W. Simons, Jr., Consulting Engineer, Jacksonville. Separate sludge digestion with trickling filters is the method of treatment used. In the background are the Dorr Clarifier used for sedimentation of the raw sewage, the Dorr Digester and the Pump House. In the foreground are the filter beds and the Dorr Traction Clarifier used for final sedimentation of trickling filter effluent.



**FOND DU LAC,  
WIS.**



Separate sludge digestion is the method of treatment used at Fond du Lac, Wis. Inside the building are laboratory, offices, etc., and also the two Dorr Clarifiers which are used for sedimentation of the raw sewage. The effluent from the Clarifiers is discharged into Lake Winnebago. Sludge from the Clarifiers goes to two Dorr Digesters. The gas from the digesting sludge is collected and burned and the heat is utilized to regulate the temperature in the Digesters. †Alvord, Burdick & Howson, Chicago, Consulting Engineers.

**BLOOMINGTON  
and NORMAL,  
ILL.**



This plant which was built under the direction of the Bloomington and Normal Sanitary District, is designed to serve a population of 54,000 in the cities of Bloomington and Normal, Illinois. The plant is of the Imhoff tank-trickling filter type and a Dorr Clarifier is installed for sedimentation of the trickling filter effluent. Taylor & Woltman, Bloomington, Consulting Engineers.



## **ALLIANCE, OHIO**

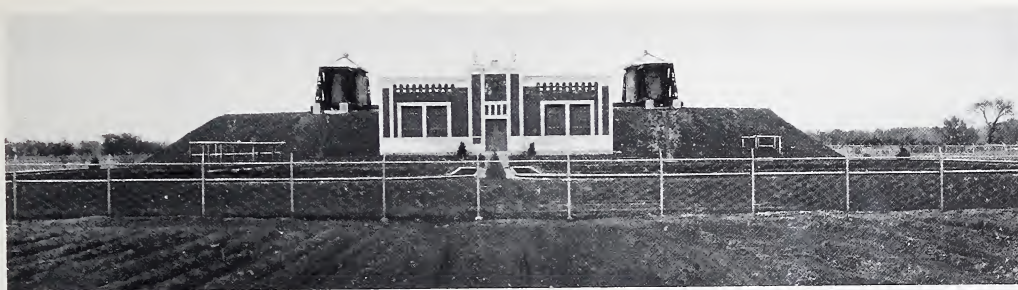
**T**hese two Dorr Clarifiers are used for sedimentation of trickling filter effluent in the Imhoff tank-trickling filter sewage treatment plant at Alliance, Ohio. A corner of the trickling filters can be seen in the foreground, and the glass-covered sludge beds are shown in the background. ¶ George B. Gascoigne, Cleveland, Consulting Engineer.



**DAYTON.  
OHIO**



In the sewage treatment plant at Dayton, Ohio, the sewage first passes to two detritus tanks, equipped with Dorr Clarifier mechanisms. These are shown in the foreground. The underflow from these tanks passes through grit chambers to two Dorrco Screen units. The screened sewage flows to Imhoff tanks and trickling filters, and the screenings are incinerated. Metcalf & Eddy, Boston, Consulting Engineers.



**TOPEKA,  
KAN.**

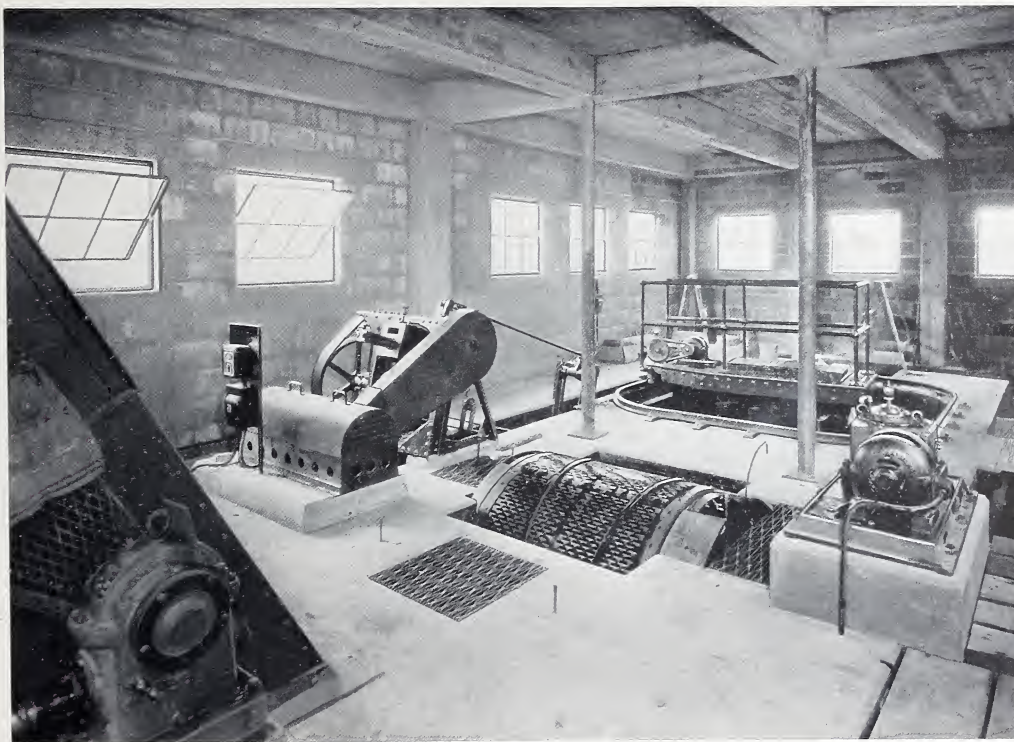
Separate sludge digestion is the method of treatment used at Topeka, Kansas. The sewage passes through a bar screen to two Dorr Detritors, which continuously remove and wash the grit. Sedimentation is carried out in two Dorr Traction Clarifiers, shown in the foreground. Two Dorr Digesters of the gas collection type are used for sludge digestion. C. A. Haskins, Kansas City, Consulting Engineer.



**DUNSMUIR,  
CAL.**



At Dunsmuir, Cal., activated sludge with digestion of the excess sludge is the method of sewage treatment used. The sewage passes through a bar screen, primary Dorr Clarifier, mechanical aerators, and secondary Dorr Clarifier. Effluent from this secondary Clarifier is discharged into a nearby stream. Sludge from the primary Clarifier and that portion of the sludge from the secondary Clarifier which is not returned for re-aeration are sent to the Dorr Digester. J. C. C. Kennedy, San Francisco, Consulting Engineer.



**EAST  
ROCHESTER,  
N. Y.**

**D**orr Detritor and Dorrco Screen unit in the sewage treatment plant at East Rochester, N. Y. This plant was designed by Mr. John F. Skinner, Consulting Engineer, of Rochester. The sewage, after passing through the Detritor and Screen, flows to a specially designed Dorr Clarifier and Digester. The clarified effluent flows through trickling filters and a sedimentation basin to discharge in an adjacent creek. Provision is made for the collection and utilization of gas from the Digester. The digested sludge is dried on sludge beds.



**SEDALIA,  
MO.**



At Sedalia, Mo., as at so many other inland towns of moderate size, separate sludge digestion is the method of sewage treatment used. The sewage passes through a bar screen to a Dorr Clarifier for sedimentation. Sludge from the Clarifier is digested in two Dorr Digesters and dried after digestion on sludge beds, while the clarified effluent passes through trickling filters before discharge into a nearby stream. Burns & McDonnell Engineering Company, Kansas City, Mo., Consulting Engineers.



**BLOOMINGTON,  
ILL.**



In the water-treatment plant at Bloomington, Ill., the water drawn from an impounding reservoir passes through the following steps:—addition of lime, mixing, primary sedimentation, carbonation, addition of alum, mixing, secondary sedimentation, filtration and chlorination. The primary and secondary sedimentation steps are carried out in Dorr Traction Clarifiers. ¶ Taylor & Woltman, Bloomington, and Alvord, Burdick & Howson, Chicago, Consulting Engineers. C. P. Hoover, Columbus, Consultant.

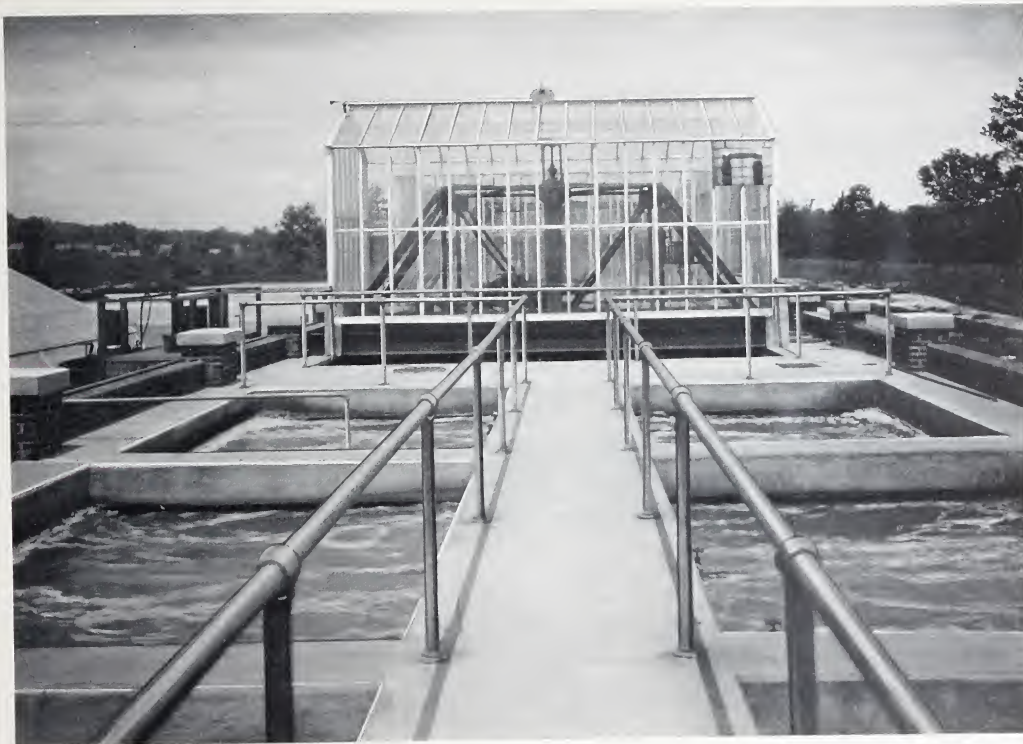


**PARSONS,  
KAN.**



A combination of activated sludge and separate sludge digestion is the method of sewage treatment used at Parsons, Kansas. The raw sewage flows to a Dorr Clarifier for pre-sedimentation, the clarified effluent passing on to the aeration chambers. A second Dorr Clarifier is used for sedimentation after aeration. Sludge from the primary Clarifier and excess sludge from the secondary Clarifier is digested in an old septic tank, which was in use before the present plant was constructed. †Black & Veatch, Kansas City, Consulting Engineers.





**TENAFLY,  
N. J.**

**T**hese two glass-covered Dorr Clarifiers are used for sedimentation of the aerated sewage in the activated sludge plant at Tenaflly, N. J. The aeration tanks are shown in the foreground and a corner of the glass-covered, sludge-drying beds can be seen at the left. <sup>†</sup> Fuller & McClintock, New York, Consulting Engineers.

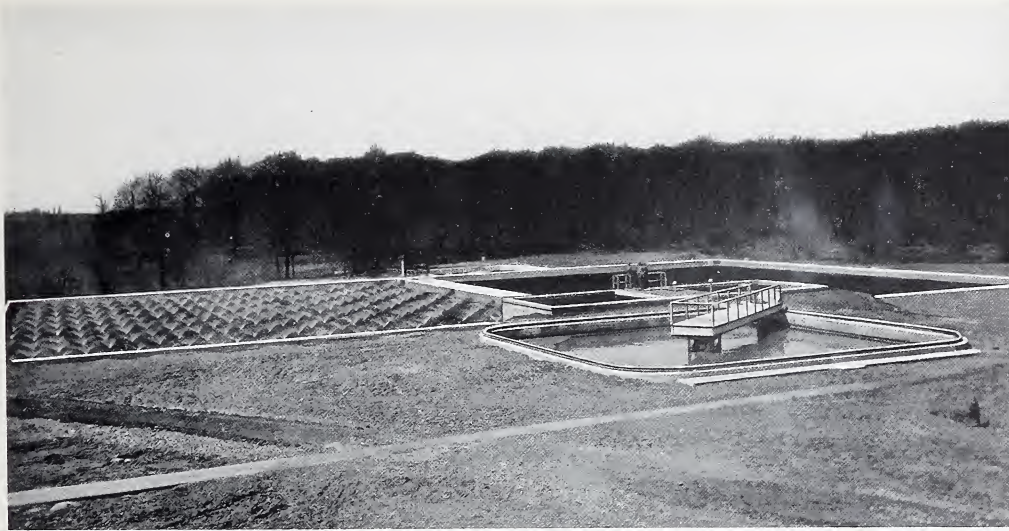


**MADISON,  
WIS.**



**T**wo Dorr Clarifiers are used for sedimentation of the filter effluent in this Imhoff tank-trickling filter sewage treatment plant at Madison, Wis. One of the Clarifiers can be seen at the extreme right of the picture. The clarified effluent is discharged into Lake Mendota. ¶ Pearse, Greeley & Hansen, Chicago, Consulting Engineers.

**DeKALB,  
ILL.**



The Sanitary District of De Kalb, Ill., constructed last year a modern sewage treatment plant, using the separate sludge digestion method of treatment. The sewage passes through a Dorrco Bar Screen and grit chambers to a Dorr Traction Clarifier for primary sedimentation. The clarified effluent runs through trickling filters and a secondary Traction Clarifier to discharge in the Kishwaukee River. The sludge from the primary and secondary Clarifiers is pumped to a Dorr gas-collection type Digester. † Suhr, Berryman, Peterson & Suhr, Chicago, Consulting Engineers.

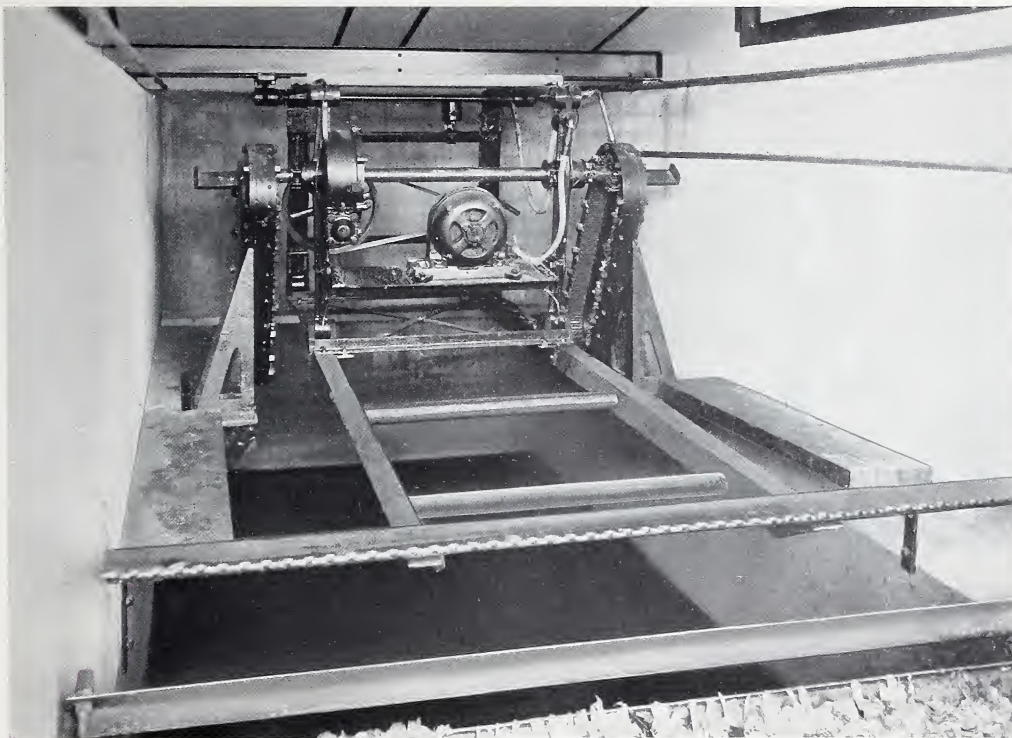
**MARION,  
OHIO**



This water-softening plant was built in 1927 at Marion, Ohio, by the Marion Water Company. The source of supply is a number of deep wells of varying hardness. A Dorr Clarifier is used to remove continuously the bulk of the precipitated sludge from the softened water. Mr. Charles P. Hoover, Columbus, was the Consulting Engineer on this project.







**TRENTON,  
N. J.**

This photo shows a Dorrcó Bar Screen, type KN, installed in the sewage treatment plant at Trenton, N. J. This screen replaced a plain bar screen, and was installed on the old bars and with the same spacing of  $1\frac{1}{2}$  inches clear opening. Mr. P. N. Daniels, C. E., City Sanitary Engineer, reports that the installation of the Dorrcó Bar Screen resulted in reducing labor requirements from 14 to  $1\frac{1}{2}$  man hours, while removals with the Dorrcó average 3 cu. ft. per million gallons as against 1.4 cu. ft. with the hand-raked screen. The cost for power to operate the screen is less than 30 cents a day.

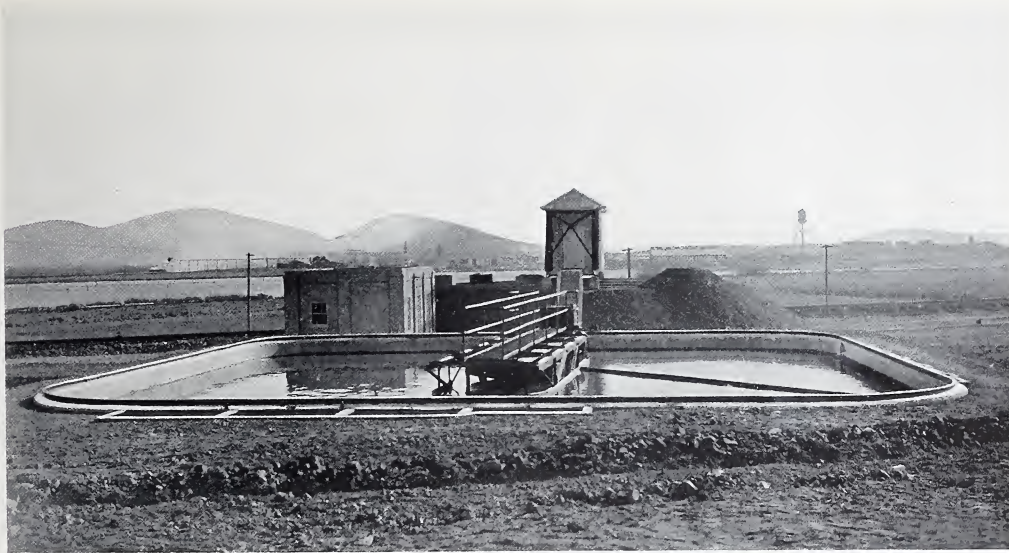
**FOSTORIA,  
OHIO**



**D**orr Clarifiers are employed for both preliminary and final sedimentation at Fostoria, O. Two units are used for sedimentation of the raw sewage, the clarified effluent passing on to trickling filters. The sludge is sent to separate digestion chambers. The trickling filter effluent flows to a third Dorr Clarifier for final sedimentation. The J. N. Chester Engineering Company, Pittsburgh, Consulting Engineers.



## **KLAMATH FALLS, ORE.**



This separate sludge digestion plant serves the city of Klamath Falls, Ore. In the foreground is the Dorr Traction Clarifier used for the sedimentation step. This Clarifier is equipped with a skimming device which removes any floating material from the surface of the sewage in the tank. The Clarifier effluent flows into Ewana Lake. The sludge is digested in the gas-collection type Dorr Digester in the background, and the gas is burned and the heat used to regulate the temperature in the Digester. ¶ C. C. Kennedy, San Francisco, Consulting Engineer.

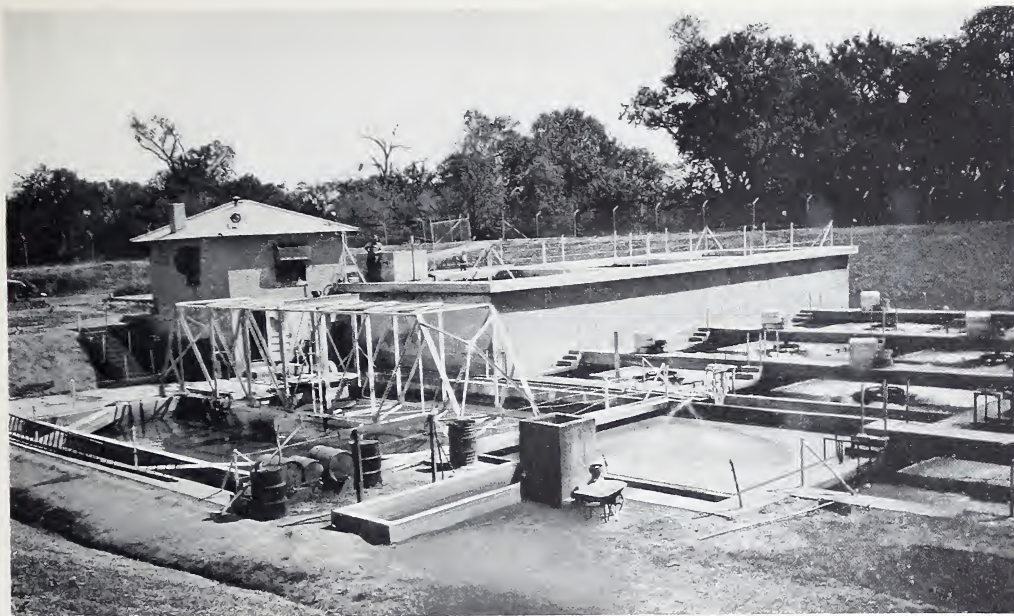


**WISCONSIN  
RAPIDS,  
WIS.**



In certain sections of Wisconsin the ground water has a high iron content. The plant shown is the iron removal plant at Wisconsin Rapids, Wis. A Dorr Clarifier is installed to remove continuously the precipitated sludge from the water, following chemical treatment. W. G. Kirchoffer, Madison, Consulting Engineer.

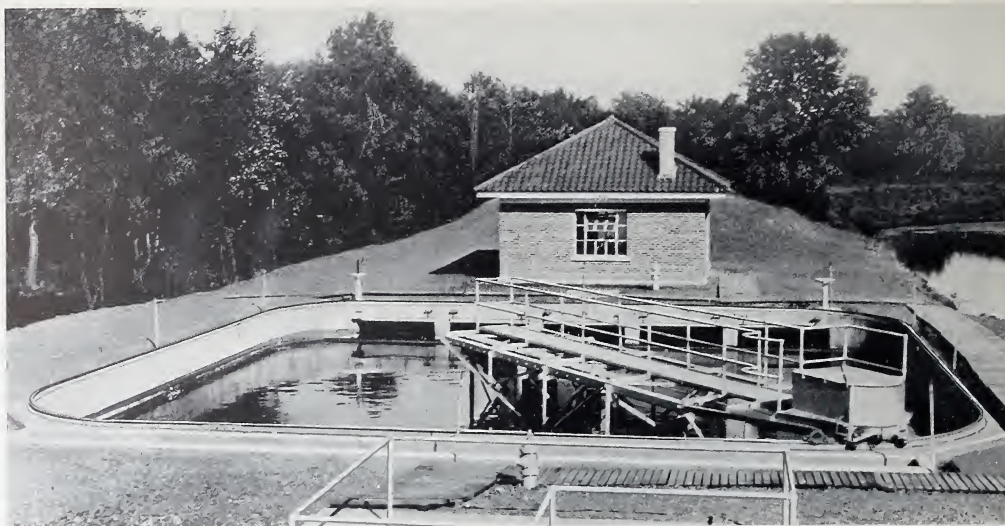




**LAWTON,  
OKLA.**

This small activated sludge plant serves the city of Lawton, Oklahoma. Aeration is carried out by the mechanical aeration units shown at the right, and sedimentation after aeration in the Dorr Clarifier in the foreground. The Benham Engineering Company, Oklahoma City, Consulting Engineers.

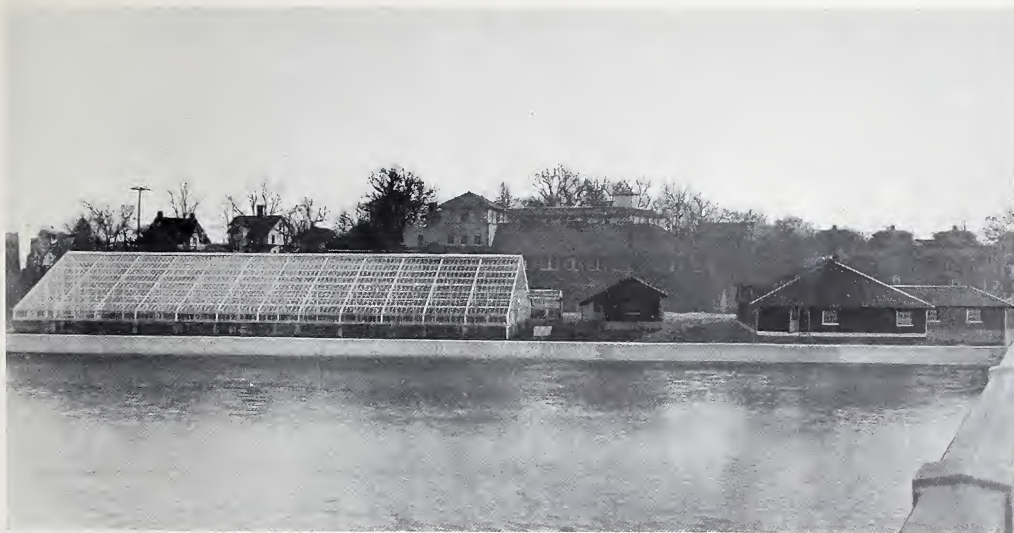
**URBANA-  
CHAMPAIGN,  
ILL.**



When the sewage treatment plant of the Urbana-Champaign Sanitary District was originally built, it consisted of Imhoff tanks and trickling filters. The secondary sludge from the trickling filter effluent was lagooned. Last year the Dorr Traction Clarifier shown above was installed in the plant for the final sedimentation step following the filters. 'Pearse, Greeley & Hansen, Chicago, are Consulting Engineers for the Sanitary District.

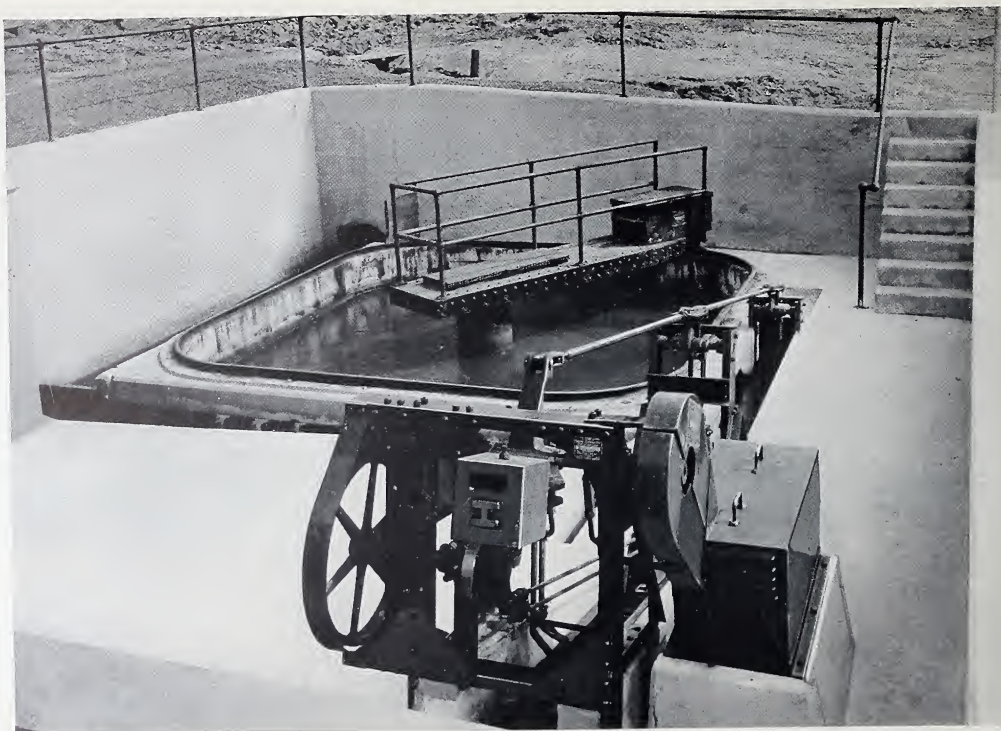


**RED BANK,  
N. J.**



Separate sludge digestion is the method of treatment used at Red Bank, N. J. The sewage first passes through a Dorrco Bar Screen and then through grit chambers to two Dorr Clarifiers. The effluent from the clarifiers is chlorinated and discharged into the Navesink River. The sludge from the Clarifiers is pumped to a gas-collection type Dorr Digester. The digested sludge is dried on glass-covered beds. The heat generated by burning the gas from the Digester is used to control the temperature of the digesting sludge. H. Burdett Cleveland, New York City, Consulting Engineer.

## HIGH POINT, N. C.



In the East Side separate sludge digestion-trickling filter treatment plant at High Point, N. C., considerable difficulty was experienced with the operation of the sedimentation units owing to the excessive amount of grit in the sewage. The installation of the Dorr Detritor shown above overcame this trouble and the Detritor continuously removes the grit from the flow and prevents it from interfering with the other treatment steps. The gas collecting and heating equipment used at this plant was also furnished by the Dorr Company. Following the successful operation of the Detritor in the East Side plant, a second unit was ordered for installation in the West Side treatment plant. This is an activated sludge plant. W. C. Olsen, Raleigh, N. C., Consulting Engineer.



U. S. A.

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Chicago, Ill..... 333 North Michigan Ave.  
Los Angeles, Cal..... 108 West 6th St.  
Wilkes-Barre, Pa..... Miners Bank Bldg.  
Atlanta, Ga..... 1503 Candler Bldg.

CANADA..... The Dorr Company, 330 Bay St., Toronto, 2

ENGLAND..... The Dorr Company, Ltd.,  
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